Paper No. 43

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HYUNKOOK SHIN
and
SAM L. SAMUELS

Appeal No. 1997-4336
Application No. 08/279,317

ON BRIEF

Before GARRIS, WARREN, and DELMENDO, Administrative Patent Judges.

DELMENDO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 20 through 22 and 24 through 28, which are all of the claims pending in the subject application.[1]

[1] In response to a new ground of rejection in the examiner's answer, the appellants inserted a new claim (i.e.,

Claim 20 is illustrative of the claims on appeal and is reproduced from the amendment filed March 21, 1995 (Paper 29):

> 20. An improved single phase liquid spin solution for flash-spinning plexifilamentary film-fibril strands consisting essentially of 8 to 35 weight percent of a fiber-forming polyolefin and 65 to 92 weight percent of a hydrocarbon/co-solvent spin liquid, the spin liquid consisting essentially of less than 90 weight percent of a hydrocarbon spin liquid selected from the group consisting of isobutane, butane, cyclobutane, 2-methyl butane, 2,2-dimethyl propane, pentane, methyl cyclobutane, cyclopentane, 2,2-dimethylbutane, 2,3-dimethylbutane, 2-methylpentane, 3-methylpentane, hexane, methyl cyclopentane, cyclohexane, 2-methyl hexane, 3-methyl hexane, heptane and mixtures thereof and greater than 10 weight percent of a co-solvent spin liquid having lower solvent strength than said hydrocarbon spin liquid and having an atmospheric boiling point of less than 100EC and selected from the group consisting of inert gases, hydrofluorocarbons, hydrochlorofluorocarbons, perfluorinated hydrocarbons, polar solvents and mixtures thereof.

The subject matter on appeal relates to a single phase liquid spin solution consisting essentially of a fiber-forming polyolefin, a particular hydrocarbon spin liquid, and a

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claim 29) in the appendix to the reply brief without submitting an amendment pursuant to 37 CFR § 1.121(a) (1984). (Papers 40 and 41.) The examiner then held that claim 29 is not a claim involved in this appeal because it has not been properly introduced into the record. (Paper 42.) Accordingly, we will not consider claim 29 in this appeal.

particular co-solvent. At least 10 weight percent of the spin liquid, which makes up 65 to 92 percent by weight of the total spin solution, is the co-solvent. The co-solvent is selected such that the co-solvent is a poorer solvent for the polyolefin than the hydrocarbon spin liquid. According to the appellants, the provision of a greater portion of co-solvent in the solution will result in a higher cloud point pressure for the solution at any given temperature. (Appeal brief, page 2.)

The examiner relies upon the following prior art references as evidence of unpatentability:

Sander et al. (Sander)	4,112,029	Sep. 5, 1978
Fenton et al. (Fenton)	4,539,374	Sep. 3, 1985

Claims 20 through 22 and 24 through 28 stand rejected under 35 U.S.C. § 103 as being unpatentable over Fenton. (Examiner's answer, pages 3-4.) Also, claims 20 through 22 and 24 through 28 stand rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103 as obvious over Sander. (Id. at pages 6-8.)

Upon consideration of the entire record, we determine that the applied prior art does not establish a prima facie case of unpatentability. Accordingly, we reverse the aforementioned rejections.

We need to address only claim 20, the sole independent claim, for each rejection. In re Fine, 837 F.2d 1071, 1076, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988).

Rejection under 35 U.S.C. § 103 over Fenton

The examiner's position is stated as follows:

> The Fenton patent teaches polyolefinic solutions... This patent further teaches the incorporation of appellants' instantly claimed hydrocarbon/co-solvent spin liquid. Appellants' claimed hydrocarbons are clearly set forth as the mutual solvents at column 3 line 57 - column 4 line 5. Appellants' instantly claimed polar co-solvents are set forth at column 4 lines 10+. This patent clearly teaches to utilize these solvents in combination with each other since they are mixed in an effort to precipitate the polyolefin. Example 1 clearly shows the low polynuclear aromatic solvent containing the polyolefin is then poured into ispropanol. The Examiner maintains that once the polyolefin and the hydrocarbon solvent are poured into the isopropanol, then appellants' instantly claimed single phase liquid solution is formulated. [Examiner's answer, pp. 3-4.]

We disagree with the examiner's conclusion. It is important to point out that appealed claim 20 recites a

"single phase liquid spin solution." (Emphasis added.) Further, it is equally significant that appealed claim 20 recites the amount for the co-solvent spin liquid as "greater than 10 weight percent." In this regard, the specification explains as follows:

> Additionally, the co-solvent spin liquid must be added to the hydrocarbon spin liquid in an amount greater than 10 weight percent of the total hydrocarbon spin liquid and the co-solvent spin liquid present in order that the co-solvent spin liquid may act as a true co-solvent and not as a nucleating agent. [Emphasis added; specification, p. 13, ll. 3-7.]

Thus, in the appellants' claimed invention, the co-solvent spin liquid must act as a true co-solvent and not a precipitating (or nucleating) agent.

By contrast, Fenton describes the use of various compounds including alcohols as a precipitating agent or non-solvent for the polyolefin resin. (Column 3, lines 29-36; column 4, lines 7-22.) Even Fenton's Example 1, which is specifically relied upon in the examiner's answer, teaches that the isopropanol acts as a precipitating solvent when combined with a solution containing the polyolefin and a low polynuclear aromatic

solvent. (Column 5, lines 8-11.) Additionally, we observe that Fenton does not indicate what relative amounts should be used when a compound such as butane, one of the "hydrocarbon spin liquid" species recited in appealed claim 20, is selected as the mutual solvent and a compound such as isopropanol, a polar solvent, is selected as the precipitating solvent. While it is true that Fenton discloses the use of a substantial amount of isopropanol in Example 1, the hydrocarbon solvent used in the example is not a "hydrocarbon spin liquid" within the scope of appealed claim 20. Given Fenton's teachings, it is our view that one of ordinary skill in the art would have selected relative amounts for butane and isopropanol that would result in precipitation, not solution. Unlike Fenton, the invention recited in appealed claim 20 requires the addition of greater than 10 weight percent of the co-solvent such that the co-solvent acts as a true co-solvent and not a precipitating agent.

Since Fenton teaches that the combination of (i) the solution containing the polyolefin and (ii) the precipitating solvent (e.g., alcohols) results in a mixture which is not a solution, it follows that Fenton's mixture does not meet each

and every element of appealed claim 20. Further, we share the appellants' view (appeal brief, page 7) that the subject matter of appealed claim 20 would not have been obvious to one of ordinary skill in the art over Fenton because the applied prior art lacks the requisite motivation, suggestion or teaching to produce a solution (as contrasted to a precipitated suspension) as in the appellants' claimed invention.

Rejection under 35 U.S.C. § 102(b)/103 over Sander

The examiner submits that the appealed claims are anticipated by the disclosure found in Sander's Example 1. Specifically, the examiner's reasoning is as follows:

> Example 1 shows a pressure vessel which incorporates therein the polyethylene and pentane. The pentane reads on appellants' instantly claimed hydrocarbon and the polyethylene is the same as appellants' instantly claimed polyolefin. Appellants' claim identifies the co-solvent as being selected from the group consisting of "inert gases". The Examiner has noted that nitrogen falls within the scope of this claim limitation. Therefore Example 1 clearly shows polyethylene in a single phase solution with the instantly claimed hydrocarbon and co-solvent, those being pentane and nitrogen. In view of this disclosure, appellants' claims are not novel. Admittedly, it seems somewhat confusing that the solution is formulated by an inert gas. The Examiner maintains however that it is reasonable to presume that the instantly claimed

> invention is either anticipated or rendered obvious from this example since each of the components of the Examples falls within the scope of the instantly claimed invention. The burden is on appellants to show otherwise. [Examiner's answer, pp. 6-7.]

Thus, a principal question raised here is whether the evidence, namely Sander, supplies a sufficient factual basis upon which to shift the burden of proof to the appellants to show that a solution within the scope of appealed claim 20 is not formed in Sander's Example 1. We do not think that it does.

Sander teaches that 14 parts of a linear polyethylene having a density of 0.96 g/cm^3, a melt index of 4.5 g/10 min. (190EC./2.16 kg) and a melting point of 130EC. is dissolved in a mixture of 51.6 parts of low-boiling naphtha and 34.4 parts of a pentane/isopentane mixture in a pressure vessel. (Column 6, lines 29-35.) The pressure is said to be 20 atmospheres. (Column 6, lines 35-36.) According to Sander, the solution is passed through a two-component nozzle downwardly and centrally into a filter tube, which is suspended in a chamber filled with nitrogen at atmospheric pressure and 40EC, to form the fibers. (Column 6, lines 36-42 and 50-54.) Sander further

teaches that the two-component nozzle consists of two concentric tubes forming an annular space between the two tubes, with nitrogen being flashed through the annular space from a storage tank in which the pressure is 20 atmospheres. (Column 6, lines 45-49.)

Although the examiner's reasoning is not entirely unreasonable, there is no factual basis or scientific reasoning to indicate that greater 10 weight percent of nitrogen would inherently or necessarily become part of the spin liquid in which polyethylene is dissolved. In this regard, it is well settled that inherency may not be established by probabilities or possibilities, i.e. it is insufficient to merely show that a certain thing may result from a given set of circumstances. Mehl/Biophile Int'l Corp. v. Milgraum, 192 F.3d 1362, 1365, 52 USPQ2d 1303, 1305 (Fed. Cir. 1999). We therefore hold that Sander's Example 1 does not anticipate appealed claim 20 within the meaning of 35 U.S.C. § 102.

Further, we determine that Sander as a whole does not provide any motivation, teaching, or suggestion to modify the solution described in reference Example 1 to additionally

contain an inert gas such as nitrogen so as to form the here claimed solution. Accordingly, we also reverse the obviousness rejection on this basis.

The examiner also states that the organic solvents listed at Sander's column 4, lines 13-15 are polar solvents within the scope of the appealed claims and that "this disclosure renders obvious the instantly claimed invention unpatentable." (Examiner's answer, page 7.) Specifically, this portion of Sander's disclosure teaches that chlorinated hydrocarbons such as methylene chloride, dichloromethane, tetrachloroethylene and chlorobenzene can be part of a solvent mixture together with pentane. As pointed out by the appellants (reply brief, pages
3-4), however, appealed claim 20 recites that the co-solvent spin liquid has a lower solvent strength than the hydrocarbon in the spin liquid. Here, we determine that the initial burden of proving a prima facie case of obviousness has not been met because there is no evidence in the record to indicate that the chlorinated hydrocarbons described in Sander would have a lower solvent strength than pentane as required by appealed claim 20. In re Piasecki, 745 F.2d 1468, 1471-72,

223 USPQ 785, 787-88 (Fed. Cir. 1984). Indeed, as pointed out by the appellants (reply brief, page 4), Sander appears to suggest that the chlorinated hydrocarbons should be added to the pentane to maximize the amount of polyolefin in the solution because these solvents are "very good solvents for the polyolefin." (Column 4, lines 36-39.) For these reasons, we reverse the examiner's obviousness rejection on this ground.

Finally, the examiner also held that the subject matter of the appealed claims would have been prima facie obvious to one of ordinary skill in the art because Sander teaches at column 4, lines 54 through 70 that "a homogeneous solution which contains pentane and appellants' instantly claimed polar solvents, specifically methanol, isopropanol and n-hexanol" may be used. (Examiner's answer, pages 7-8.) We note, however, that the polar solvents described at column 4, lines 63 and 64 are "non-solvents (precipitating agents)." In the invention recited in appealed claim 20, the polar solvents are true co-solvents, not precipitating agents. We therefore also reverse this ground of rejection.

The decision of the examiner is reversed.

REVERSED

BRADLEY R. GARRIS Administrative Patent Judge	)	
CHARLES F. WARREN Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
ROMULO H. DELMENDO Administrative Patent Judge	)	

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